No. 649,806. Patented May 15, 1900.

J. C. BUSCHE.

DRIVING MECHANISM FOR BICYCLES OR OTHER DEVICES.

(Application filed Jan. 19, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1

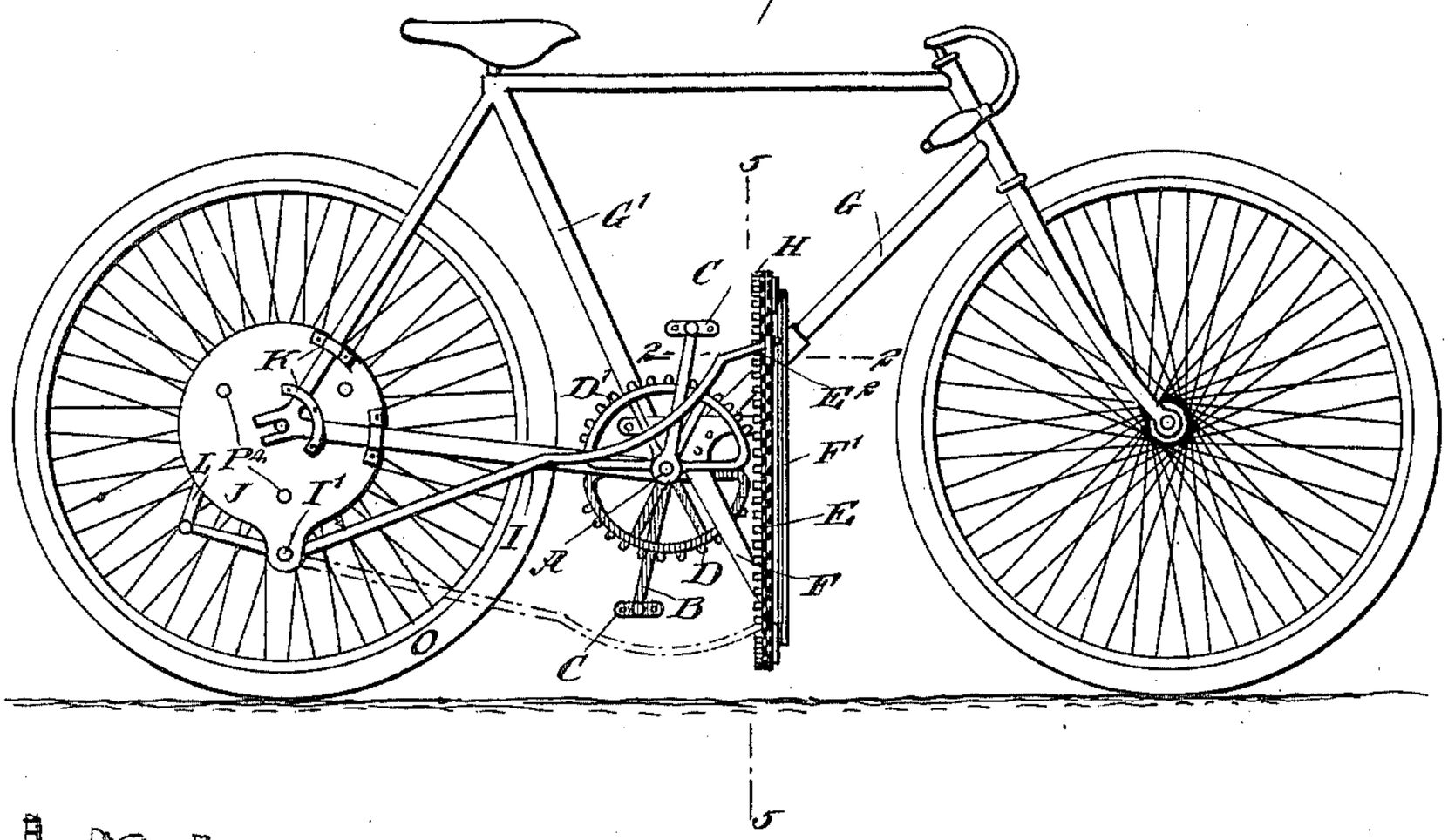

Fig 2

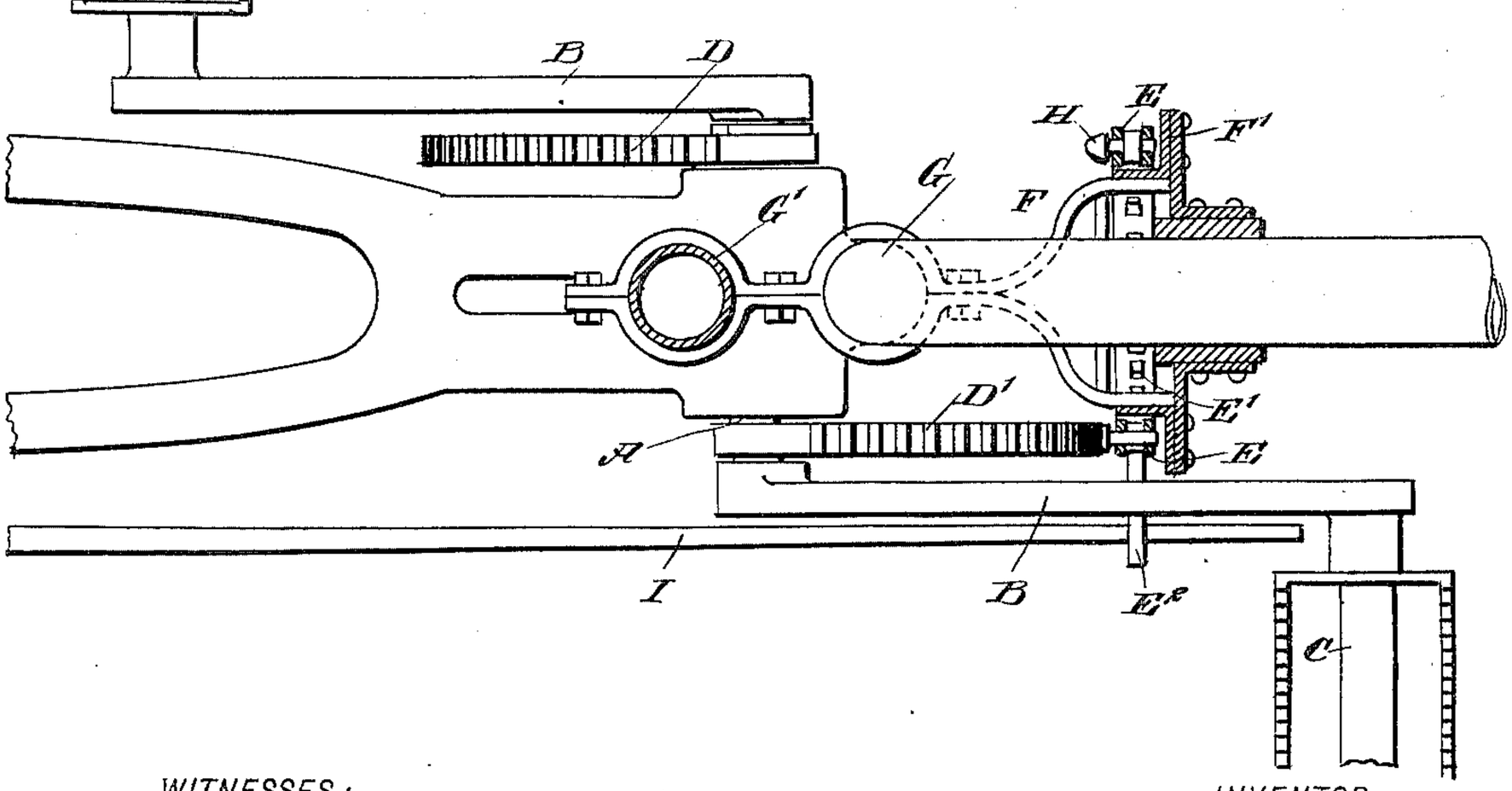

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Fig 4

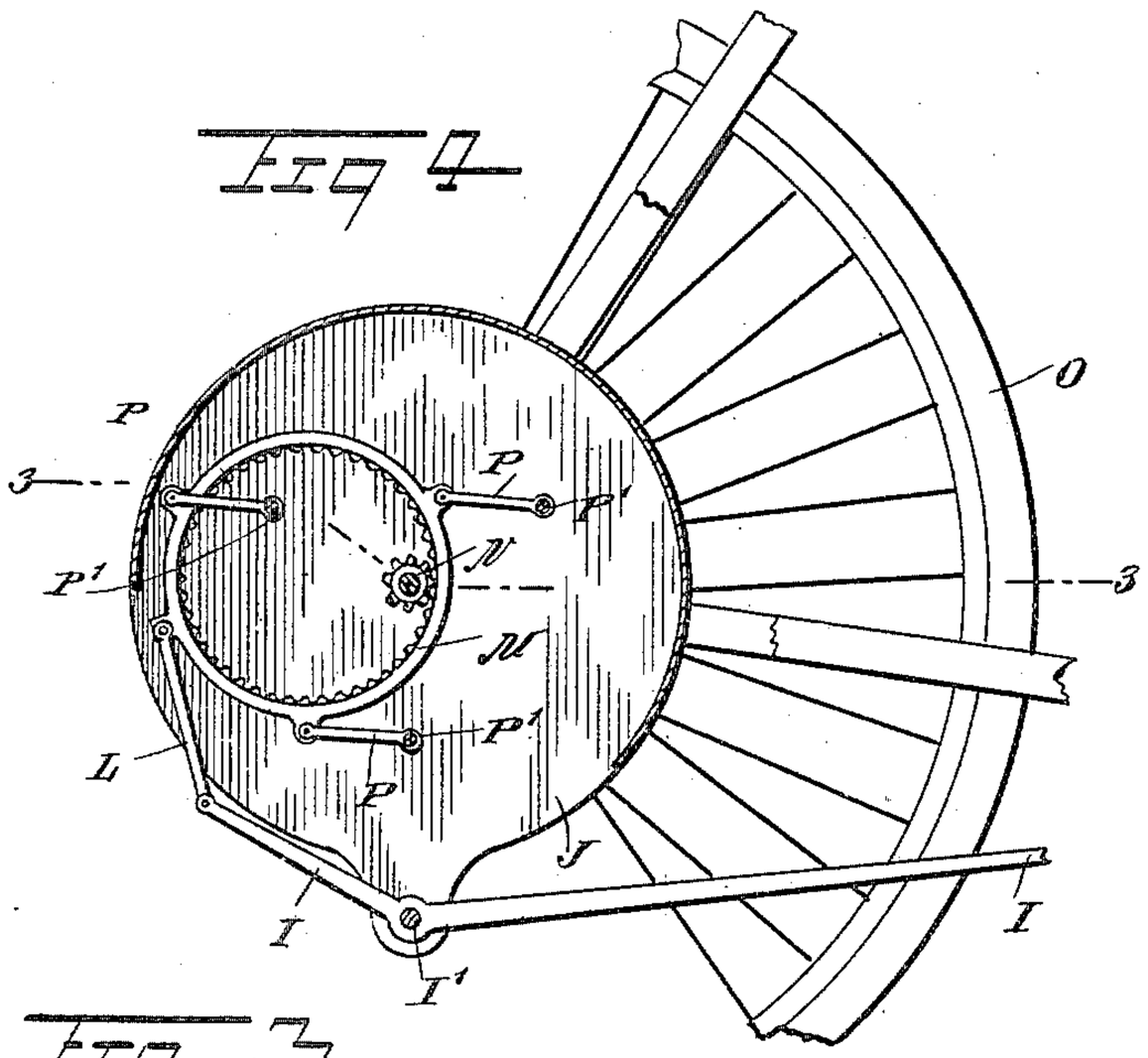

Fig 3

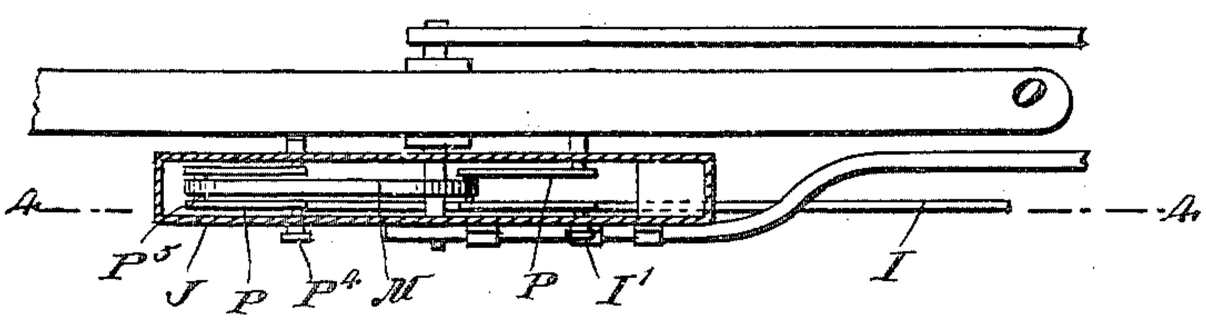

Fig 5

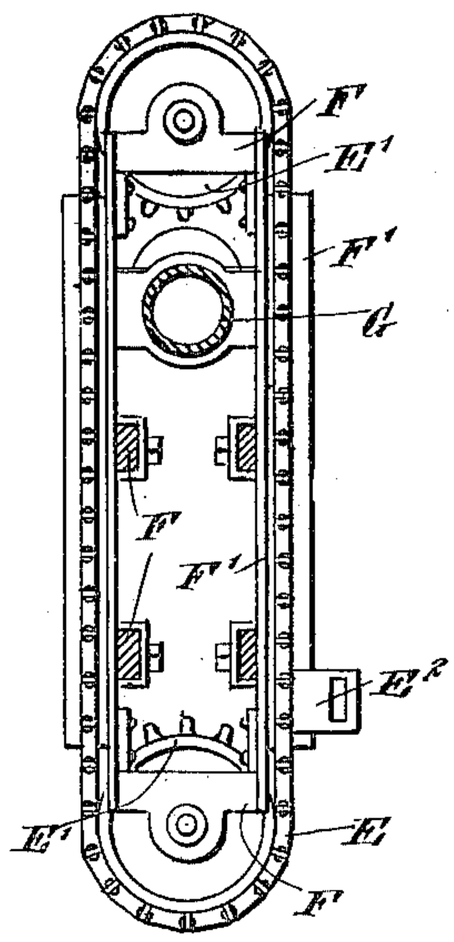

Fig 6

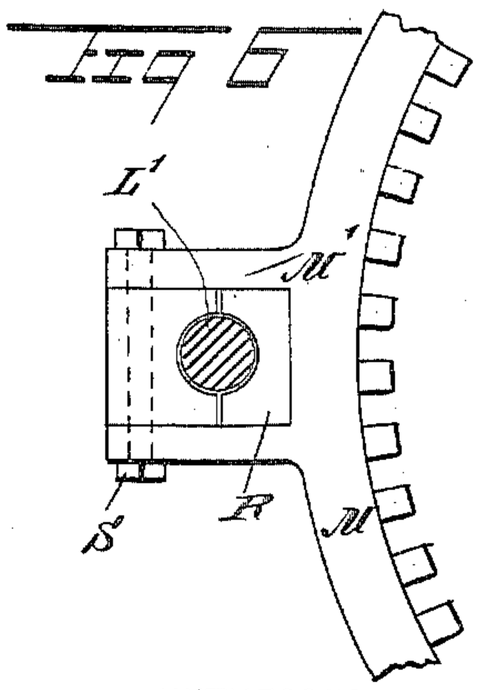

Fig 9

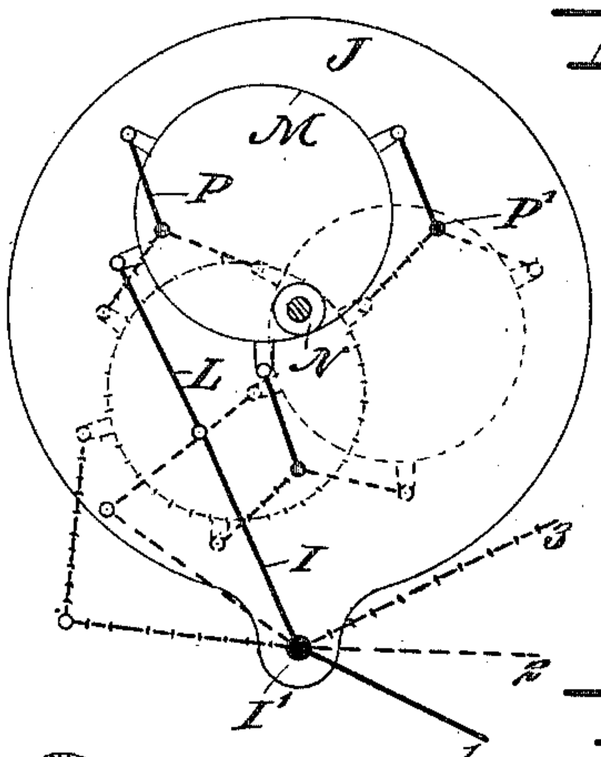

Fig 7

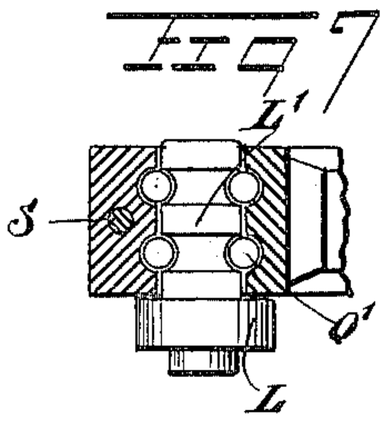

Fig 8

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UNITED STATES PATENT OFFICE.

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DRIVING MECHANISM FOR BICYCLES OR OTHER DEVICES.

SPECIFICATION forming part of Letters Patent No. 649,806, dated May 15, 1900.

Application filed January 19, 1900. Serial No. 2,013. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BUSCHE, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Driving Mechanism for Bicycles or other Devices, of which the following is a full, clear, and exact description.

My invention relates to driving mechanisms applicable to bicycles and other devices, and has for its object to provide a mechanism of the class indicated which is chainless in the sense that there is no direct chain connection between the pedal-shaft and the hub of the driving-wheel.

The object is to provide a mechanism in which the usual rotary movement of the pedals is preserved, while the parts operating upon the driven wheel are in the nature of reciprocating levers operating a driving-wheel. This driving-wheel in my construction is a toothed rim engaging a pinion on the driven wheel and receiving a peculiar motion in the manner hereinafter particularly set forth.

The invention will first be fully described, and its features of novelty will then be pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a bicycle provided with my improved mechanism. Fig. 2 is a plan view drawn on an enlarged scale, with parts in section on the line 2 2 of Fig. 1. Fig. 3 is a plan, with parts in section on the line 3 3 of Fig. 4, showing the mechanism connected directly with the driven wheel. Fig. 4 is a sectional elevation on the line 4 4 of Fig. 3. Fig. 5 is a sectional elevation on the line 5 5 of Fig. 1. Figs. 6, 7, and 8 are details of the driving-wheel and of means for connecting it with the driving-lever, and Fig. 9 is a diagram illustrating the peculiar motion of the driving-wheel.

The frame of the bicycle is of substantially the usual construction. The crank-shaft A is journaled in the customary crank-hanger and is provided with cranks B, carrying pedals C. Instead of the customary sprocket-wheel the crank-shaft carries two sprocket-wheels D D′ on opposite sides, said sprocket-wheels being half-circular and extending in opposite directions, as clearly indicated in Figs. 1 and 2—that is, while one sprocket-wheel D′ is up the other sprocket-wheel D is down. These sprocket-wheels are adapted to engage alternately with a sprocket-chain E, disposed vertically in advance of the crank-shaft and supported on wheels E′, journaled in a frame F, which is supported on the bar G and the seat-mast G′ of the cycle in the manner shown best in Fig. 2. This frame also has angular portions F′ engaging the front face of the chain E, so as to hold it in proper relation to the sprocket-wheels D D′. The chain E has rivets with enlarged heads H, forming teeth to be engaged by the teeth of the sprocket-wheels. It will be understood that as the sprocket-wheels D D′ alternately engage with opposite runs of the chain E the chain will receive what may be termed a "reciprocating" movement—that is, first one run will be drawn downward and then the other run, causing the first-mentioned run to move upward. This reciprocating movement is transmitted to a lever I, which passes loosely through a guide E^2, secured to the chain E and projecting outwardly therefrom, as shown in Fig. 5. The lever is fulcrumed at I′ upon a casing J, secured to the rear portion of the frame by suitable clips K. The rear end of the lever I is pivotally connected with a link L, which has a similar connection with the driving-wheel or rim M. This wheel has teeth on its inside and is constantly in engagement with a pinion N on the hub of the rear wheel or driven wheel O. The wheel M is supported by the link L, above mentioned, and also by three cranks P, pivoted at P′ upon the casing J and connected at their free ends at equally-spaced points on the periphery of the wheel M. The pivots P′ also are equally spaced from each other and from the center of the pinion N, forming the corners of an equilateral triangle.

To secure an easy motion, I prefer to construct the cranks P and their connection with the driving-wheel M as illustrated in detail in Figs. 6, 7, and 8. As here shown the pivot-pins P′ of the cranks have annular grooves P^2 for the reception of the balls Q, which are also seated in half-cylindrical bearing-sleeves P^3, these sleeves being held together by a cap P^4,

which also excludes dust. The cranks P are double, as shown, so as to embrace the wheel M, and have cross-pieces P^5, which pass through sectional bearings R, secured to the wheel M, the same construction being used for the pin L′ of the link L. (See Figs. 6 and 7.) These sections are held in guides M′ on the wheel M and are held in position by means of a screw-bolt S. The cross-pins P^5 L′, as well as the bearing-sections R, are provided with grooves to receive the balls Q′.

It will be understood that as the lever I oscillates on its pivot I′ the link L will cause the driving-wheel M to swing around in the casing J, remaining always in engagement with the pinion N, owing to the guiding action of the cranks P, which always remain parallel; but, as will be understood best by reference to the diagram in Fig. 9, the point of contact of the driving-wheel M with the pinion N varies constantly and passes progressively from the front face of the pinion to the bottom thereof, then to the rear face, and finally to the top. The motion is a very easy one and produces comparatively little friction.

It will be obvious that I might provide levers I on each side of the wheel and mount pedals directly upon the said levers, thereby dispensing with the crank-shaft, the sprockets, and the chain. This, however, would be open to the objection that the rider would be unable to use the accustomed pedal motion of the feet, and, moreover, as the driving mechanism would have to be duplicated on each side of the wheel there would be very little saving in weight, if any. Therefore although the arrangement alluded to might be found convenient in special cases I prefer the one illustrated in the drawings.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A driving mechanism comprising a drive-shaft having thereon segmental sprocket-wheels mounted to rotate in different planes and facing in different directions, and a chain the runs of which are disposed in the planes of rotation of said wheels and arranged to be engaged thereby alternately to produce a reciprocating motion of the chain when the drive-shaft rotates.

2. A driving mechanism comprising a drive-shaft having thereon segmental sprocket-wheels mounted to rotate in different planes and facing in different directions, a chain the runs of which are disposed in the planes of rotation of said wheels and arranged to be engaged thereby alternately, to produce a reciprocating motion of the chain when the drive-shaft rotates, a lever engaging said chain loosely, and driven mechanism connected with said lever.

3. A driving mechanism comprising a drive-shaft having thereon segmental sprocket-wheels mounted to rotate in different planes and facing in different directions, a chain the runs of which are disposed in the planes of rotation of said wheels and arranged to be engaged thereby alternately, to produce a reciprocating motion of the chain when the drive-shaft rotates, and a stationary frame forming a backing for the chain on the side opposite to that engaged by the sprocket-wheels.

4. A driving mechanism comprising a drive-shaft having thereon segmental sprocket-wheels mounted to rotate in different planes and facing in different directions, and a chain the runs of which are arranged in the planes of rotation of the said wheels, the chain including pivots or connecting-pins extended to form teeth adapted to be engaged by said sprocket-wheels.

5. In a bicycle or the like, the combination with the pedal-shaft carrying on opposite sides of the machine segmental sprocket-wheels facing in opposite directions, of a vertically-disposed chain having its runs arranged in the planes of rotation of the said sprocket-wheels, to be engaged thereby alternately, a lever extending lengthwise of the machine and connected loosely with said chain, a pinion on the hub of the driven-wheel, a driving-ring engaging said pinion, a driving connection between said lever and the driving-ring, and a supporting and guiding device for said ring, consisting of cranks pivoted to the frame of the machine at points equally distant from each other and from the center of the pinion, said cranks being also pivotally connected with the ring at equidistant points.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN C. BUSCHE.

Witnesses:
W. L. GRUBB,
ALVIE MILLER.